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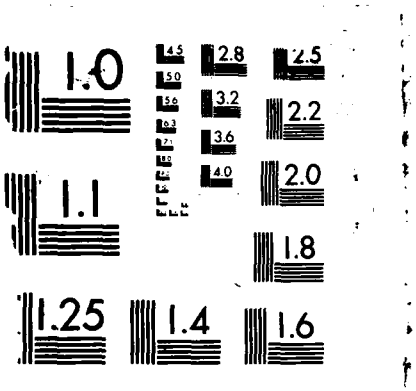

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OPTIMIZATION-BASED DESIGN OF CONTROL SYSTEMS

Final Technical Report
AFOSR Grant 84-0250
(July 1, 1984 - December 31, 1986)

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Abstract

(i) A VAX 11/780 system has been expanded so as to facilitate the implementation of DELIGHT.MIMO, an interactive software system for the solution of optimal, worst case design of multivariable control systems. (ii) A SUN workstation - based system has been assembled for experiments in distributed computing for the optimal, integrated design of flexible structures and their control systems.

Introduction

As part of our research on optimization-based design of multivariable control systems (sponsored by ONR) and on the optimization-based, integrated design of large space structures and their control systems (sponsored by AFOSR), we are carrying out research on the development of interactive software systems for the implementation of the design techniques we are producing. In particular, (i) we are developing DELIGHT.MIMO, an interactive computing system for the optimal, worst case design of multivariable control systems, and (ii) we are begining to architect a distributed computing system, consisting of a work station for user-machine interaction and a large frame computer for system response simulation, for the design of flexible structures and their control systems.

Summary of Equipment Use

(i) The expansion of our VAX 11/780 system and associated graphical terminals has consisted of the addition of the following items:

1. MS780EC memory controller with 2Mb memory
2. 6Mb National Semiconductor memory
3. TU58-AB tape drive with formatter
4. 10 Mb 3com ether connection
5. Tektronix 4115B color terminal
6. 2 Fujitsu Eagle disk drives

As a result of these additions, system response has increased considerably and the DELIGHT.MIMO system will be usable in medium size design experiments. Furthermore, we were able to implement a much more sophisticated color graphical interaction capability than the one we had before that.

(ii) The distributed computing, optimal design system is now begining to be implemented. The workstation system consists of the following items which, due to changes in the manufacturers' lines, took an unexpectedly long time to assemble:

1. Sun-2/170 (rackmountable SunStation)
   MC68010 CPU and 2-RS232 serial lines
   Two 1.0 Mbyte memory boards
   Ethernet Interface
   15 - slot IEEE-796 multibus card cage
2. 4.2 Unix software distribution
3. Two main memory expansions
4. Floating Point Processor
5. Monitor, keyboard, and mouse
6. SunColor Graphics
   19-inch RS-170 color monitor
7. 1/4 inch tape cartridge tape subsystem
8. File Server (a stripped SUN 120)
9. 384Mb formatted disk system
10. Ethernet accessories
11. Additional SUN 3/50 Workstation

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